Wildlife International, Ltd.
ECOTOXICOLOGY AND ENVIRONMENTAL FATE

March 11, 2010

Robert Hoke
E.I. du Pont de Nemours and Company
Wilmington, Delaware 19898

RE: Report: DuPont D-18405-336, WR 18405, SC 333

Dear Mr. Hoke,

The following is a summary of the findings for the study: H-28548: A Pilot Reproduction Study with the Northern Bobwhite Quail, *Colinus virginianus* (Wildlife International Ltd. Project No.: 112-651). The study evaluated the effects upon adult northern bobwhite quail of dietary exposure to H-28548 over a six-week period. Effects on health, weight gain and feed consumption were examined. In addition, the effects of adult exposure to H-28548 on the number of eggs laid, normal development of eggs, viability of the embryos, percent hatchability, offspring survival and egg shell thickness were evaluated.

Three treatment groups, each containing five pairs of northern bobwhite quail, were fed diets containing H-28548 at nominal dietary concentrations of 10, 100 or 1000 ppm. A fourth control group, fed non-treated diet, was maintained concurrently with the treatment groups.

METHODS

Test diets were prepared by mixing H-28548 into a premix that was used for weekly preparation of the final diet. Homogeneity of the test substance in the diet was evaluated by collecting six samples from each of the 10 and 1000 ppm treated diets and one sample from the control diet on Day 0 of Week 1. Samples also were collected from the 100 ppm treated diet on Day 0 of Week 1, and from the control and all treatment group diets during Week 6 of the test to measure/verify test concentrations. Additionally, control and treatment group diet samples were collected from the trough feeders on Day 7 of Week 1 to assess stability of the test substance under actual test conditions.

The test birds were acclimated to the facilities and study pens prior to initiation of the test. During the study, all adult birds were observed daily for signs of toxicity or abnormal behavior. A record was maintained of all clinical observations. Adult body weights were measured at test initiation, on Weeks 2, 4, and at adult termination. Feed consumption for each pen was measured weekly throughout the test. At the conclusion of the exposure period, all adult birds were euthanized and necropsied.

Eggs were collected daily from all pens, when available. During Weeks 1 and 2 eggs were counted, then disposed. Eggs produced during Weeks 3 through 6 were counted and those selected for egg shell thickness measurement were removed. The remaining eggs were identified by an alphabetic lot

code (Lots A, B, C & D). All eggs laid in a weekly interval were considered as one lot. All remaining eggs were candled to detect egg shell cracks or internal abnormalities. Cracked or abnormal eggs were recorded and discarded. All eggs not discarded were placed in an incubator. Eggs were candled on Day 12 of incubation to determine embryo viability and on Day 21 to determine embryo survival. On Day 21 of incubation, the eggs were placed in a hatcher and allowed to hatch. All hatchlings, unhatched eggs and egg shells were removed from the hatcher on Day 25 or 26 of incubation. The individual body weight of the surviving hatchlings was determined. Hatchlings were leg banded for identification by pen of origin and then routinely housed according to the appropriate parental concentration grouping in brooding pens until 14 days of age. Offspring were observed daily from hatching until 14 days of age. At 14 days of age, the average body weight by parental pen of all surviving offspring was determined.

All eggs laid during the six-week test were used in evaluation of egg production among the test groups. The evaluations of the other reproductive parameters were based on the eggs produced during Weeks 3 through 6 of the test (Lots A – D).

RESULTS

Mortalities and Clinical Observations

No mortalities occurred during the course of the study. Incidental clinical observations normally associated with penwear were observed during the test. Such observations included foot and head lesions and an ocular injury. Except for the incidental clinical findings, all birds in the 0, 10, 100, or 1000 ppm treatment groups were normal in appearance and behavior for the duration of the test. Daily clinical observations are presented in Appendix XI.

Body Weight and Feed Consumption

When compared to the control group, there were no apparent treatment-related effects upon body weight at the 10, 100 or 1000 ppm test concentrations at any body weight interval. Mean body weight measurements are presented in Table 1. Individual body weight measurements are presented in Appendix I.

When compared to the control group, there appeared to be no treatment-related effects upon feed consumption at the 10, 100 or 1000 ppm test concentrations at any feed consumption interval. Mean feed consumption measurements are shown in Table 2. Feed consumption measurements by pen are presented in Appendix II.

Reproductive Results

Due to the small sample size and short length of range-finding tests, it is not atypical for variation in egg production to be observed. While reproductive parameters were variable among individuals, when compared to the control group, there appeared to be no treatment-related effects upon reproductive performance at the 10 or 100 ppm test concentrations. However, at the 1000 ppm test concentration there was a slight reduction in viability of embryos, which was also evidenced in reductions in numbers of hatchlings and 14-day old survivors as percentages of eggs set and the maximum set. Summaries of the reproductive data are presented in Table 3. Reproductive parameters by pen are presented in Appendices III, IV and V.

Egg Shell Thickness Measurements

When compared to the control group, there appeared to be no treatment-related effects upon egg shell thickness measurements at the 10, 100 or 1000 ppm test concentrations. Egg shell thickness measurement data are presented in Table 5 and Appendix VI.

Offspring Body Weights

When compared to the control group, there appeared to be no treatment-related effects upon offspring body weights at the 10, 100 or 1000 ppm test concentrations. Offspring body weight data are presented in Table 6 and Appendices VII and VIII.

Gross Necropsy

At the end of Week 6 (Day 42), all surviving birds were euthanized and subjected to gross necropsy. All findings observed were considered to be incidental and not related to treatment. Necropsy data, summarized by treatment group, are presented in Table 7. Individual necropsy findings are reported in Appendix IX.

Analytical Chemistry

Homogeneity of the test substance in the diet was evaluated by collecting six samples each from the 10 and 1000 ppm treatment group diets on Day 0 of Week 1. Additionally on Day 0, two samples were collected from the 100 ppm treatment group to verify test substance concentration in the diet. Two samples were collected from the feeders for each of the treatment concentrations on Day 7 of Week 1 to verify the presence of the test substance under actual test conditions. Additional verification samples, two each from the 10, 100 and 1000 ppm treatment groups, were collected on Day 0 of Week 6. Results of the analysis of the diet samples verified that the test substance was present at the appropriate concentrations, that the diet mixes were homogeneous and that the test substance was stable for the length of exposure. Results of the analysis of the diet samples are presented in Appendix X.

Conclusion

Northern bobwhite quail were exposed to H-28548 at dietary concentrations of 0, 10, 100 and 1000 ppm over a six-week period. There were no treatment-related mortalities, overt signs of toxicity or treatment-related effects upon body weight or feed consumption at any of the test concentrations. Additionally, there were no treatment-related effects upon any of the reproductive parameters measured at the 10 or 100 ppm test concentrations. At the 1000 ppm test concentration there were slight reductions in viability of embryos, and reductions in numbers of hatchlings and 14-day old survivors as percentages of eggs set and maximum set that were likely treatment related. The no-observed-effect concentration for northern bobwhite quail exposed to H-28548 in the diet during the study was 100 ppm.

Sincerely,

Diana L Temple

Diana L. Temple

DLT/112-651 Report.doc
Enclosure

Table 1
Mean Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Experimental Group	Sex	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
Control	Male	212	2	214	7	221	1	222	10
	Female	232	0	232	5	238	0	237	5
10 ppm	Male	213	2	215	1	216	-2	213	1
	Female	237	3	240	1	241	4	245	8
100 ppm	Male	213	0	213	1	214	-1	213	0
	Female	232	0	232	1	234	5	239	6
1000 ppm	Male	213	4	217	2	219	-4	214	1
	Female	236	-4	232	4	236	3	239	3

The means for body weights and body weights changes were calculated and rounded separately.

Figure 1
Mean Adult Male Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

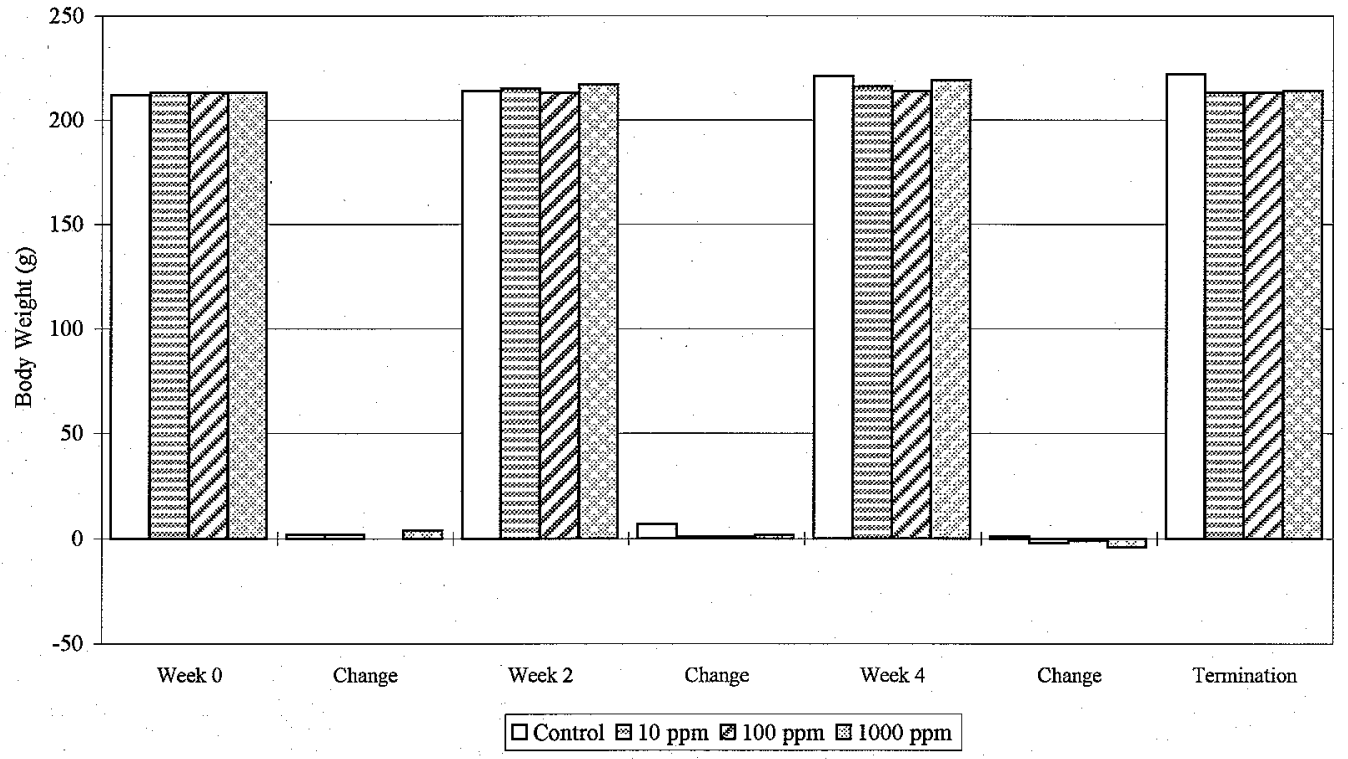

Figure 2
Mean Adult Female Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

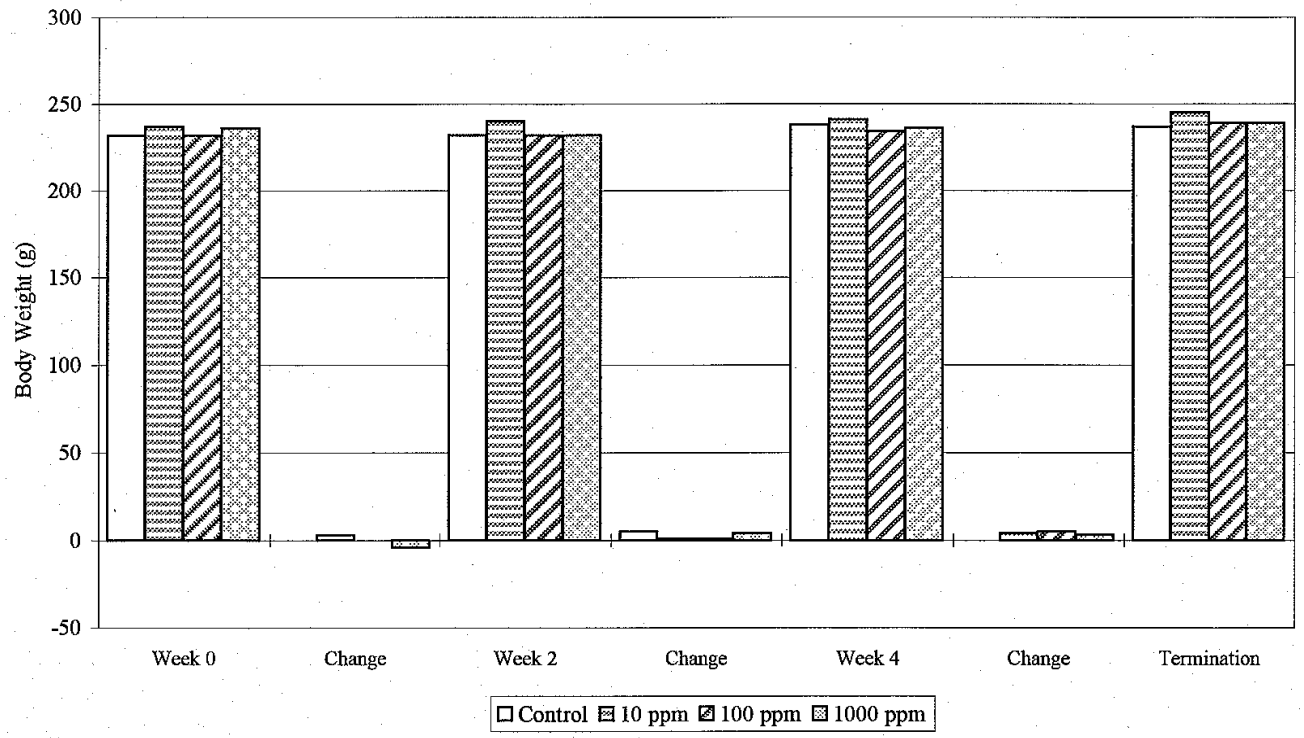

Table 2
Mean Feed Consumption (g/bird/day)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Experimental Group	Weeks					
	1	2	3	4	5	6
Control	19	20	23	24	23	23
10 ppm	20	22	24	24	22	24
100 ppm	19	21	25	24	23	24
1000 ppm	18	21	27	24	24	24

Figure 3
Mean Feed Consumption (g/bird/day) from a
Northern Bobwhite Quail Pilot Reproduction Study with H-28548

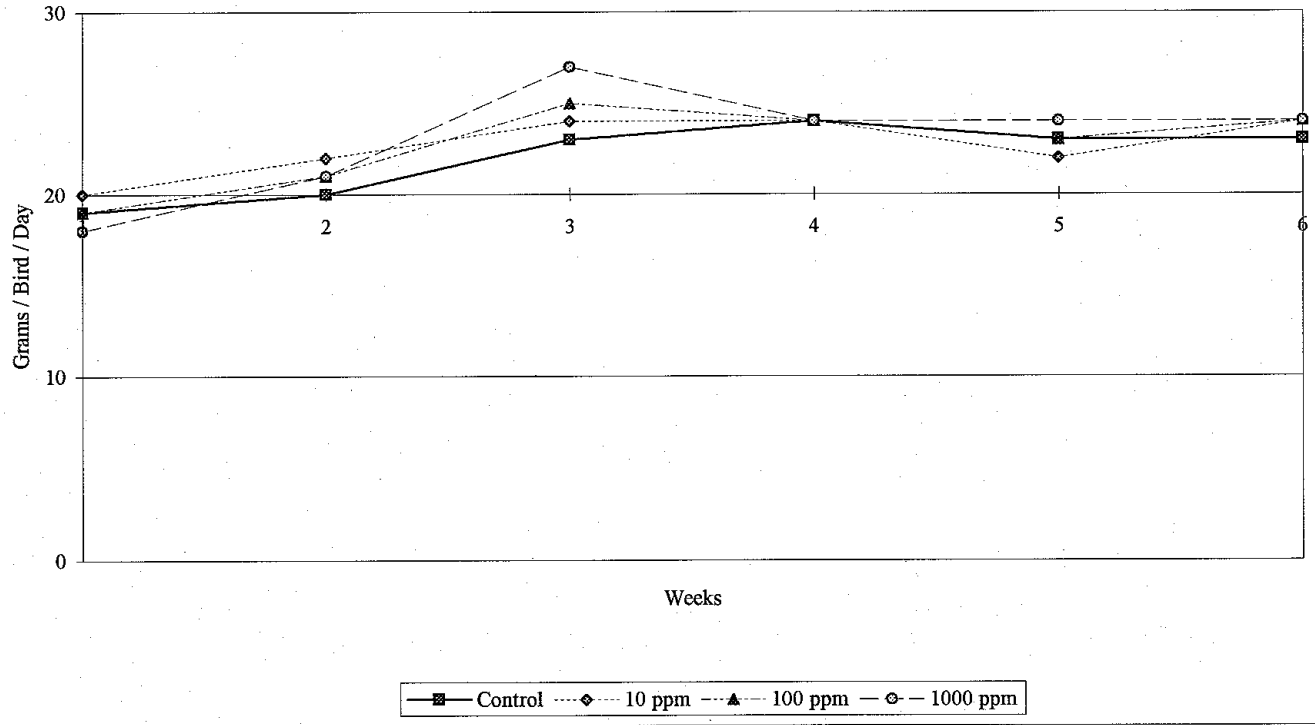

Table 3
Egg Production Data by Week
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Experimental Group	Weeks						Totals	Eggs/Hen/Day
	1	2	3	4	5	6		
			Lot A	Lot B	Lot C	Lot D		
Control	24	23	26	33	33	32	171	0.81
10 ppm	23	25	30	32	31	31	172	0.82
100 ppm	23	28	31	34	34	34	184	0.88
1000 ppm	22	27	26	31	31	33	170	0.81

Figure 4
Mean Egg Production (Eggs/Hen/Day) from a
Northern Bobwhite Quail Pilot Reproduction Study with H-28548

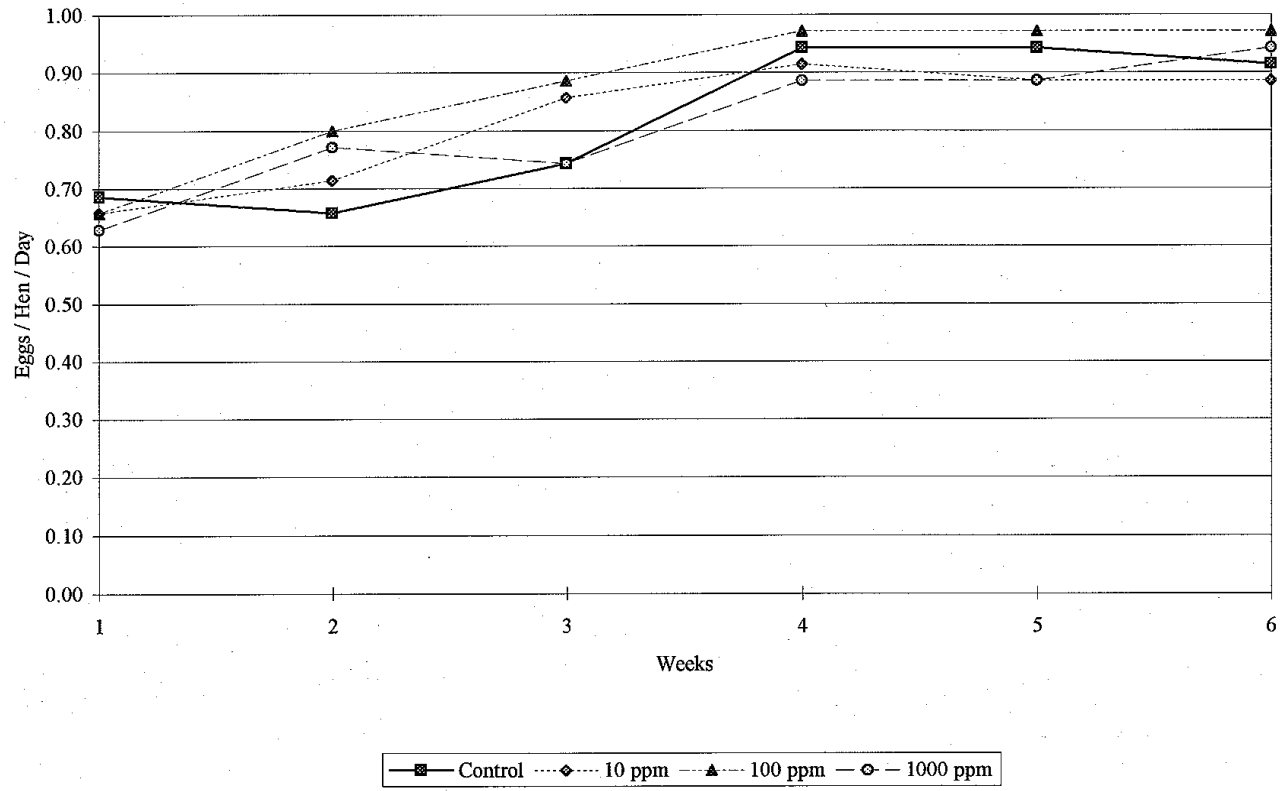

Table 4
Summary of Reproductive Performance[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

	Experimental Group (ppm a.i.)			
Reproductive Parameter	Control	10	100	1000
Number of Replicates	5	5	5	5
Eggs Laid (Weeks 3 thru 6)	124	124	133	121
Eggs Cracked	3	0	0	2
Eggs Set	111	114	121	108
Viable Embryos	111	111	120	96
Live 3-Week Embryos	111	110	120	96
Hatchlings	102	106	114	90
14-Day Old Survivors	90	96	106	82
Eggs Laid / Hen	24.8	24.8	26.6	24.2
Eggs Laid / Hen / Day	0.89	0.89	0.95	0.86
14-Day Old Survivors / Hen	18	19	21	16

Normalized as Percentages (%)

	Experimental Group (ppm a.i.)			
Reproductive Parameter	Control	10	100	1000
Number of Replicates	5	5	5	5
Eggs Laid (Weeks 3 thru 6)	124	124	133	121
Eggs Laid / Maximum Laid (%)	89	89	95	86
Eggs Cracked / Eggs Laid (%)	2	0	0	2
Viable Embryos / Eggs Set (%)	100	97	99	90
Live 3-Week Embryos / Viable Embryos (%)	100	99	100	100
Hatchlings / Live 3-Week Embryos (%)	92	97	95	94
14-Day Old Survivors / Hatchlings (%)	88	91	93	90
Hatchlings / Eggs Set (%)	92	92	93	84
14-Day Old Survivors / Eggs Set (%)	81	84	88	76
Hatchlings / Maximum Set (%)	82	85	91	72
14-Day Old Survivors / Maximum Set (%)	72	77	85	66

[1] Based on 28 days of egg production (Days 15-42).

Table 5
Mean Egg Shell Thickness Measurements (mm)
from a Northern Bobwhite Quail Pilot Reproduction Study
with H-28548

Treatment Group (ppm)	Replicates 1	2	3	4	5	Mean	SD
Control	0.208	0.233	0.213	0.210	0.233	0.220	0.012
10	0.211	0.246	0.224	0.252	0.229	0.233	0.017
100	0.257	0.217	0.231	0.232	0.242	0.236	0.015
1000	0.229	0.226	0.217	0.225	0.207	0.221	0.009

Table 6
Mean Body Weight (g) of Hatchling and 14-Day Old Survivors
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Experimental Group (ppm)	Hatchlings			14-Day Old Survivors		
	Mean	SD	Number	Mean	SD	Number
Control	5.7	0.4	102	25	1.9	89
10	5.6	0.3	106	25	1.3	96
100	5.9	0.2	114	28	2.3	106
1000	5.8	0.2	90	27	3.1	82

Table 7
Summary of Gross Pathological Observations
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548
Surviving Birds Euthanized at Test Termination

Finding	Males ppm a.i.				Females ppm a.i.			
	Control	10	100	1000	Control	10	100	1000
Number of birds	5	5	5	5	5	5	5	5
External - feather loss	0	1	0	1	2	1	1	2
External - toe lesions or missing tips	0	1	0	0	0	0	0	0
External - lower back lesion	0	0	0	1	0	0	0	0
Liver - pale	1	0	0	0	0	0	0	0
Liver - mottled	1	0	0	0	0	0	1	0
Liver - small (~ 1 mm) offwhite cysts on lower left lobe	0	0	0	0	0	0	0	1
Reproductive - right testis small, ≤ 1.5 cm	0	3	2	1	-	-	-	-
Not remarkable	4	1	3	3	3	4	3	2

Appendix I - Table 1
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Control
Males

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
401	214	0	214	12	226	6	232	18
402	210	1	211	-1	210	0	210	0
403	209	6	215	8	223	-3	220	11
404	211	4	215	5	220	-2	218	7
405	214	0	214	13	227	2	229	15
Mean	212	2	214	7	221	1	222	10
SD	2	3	2	6	7	4	9	7

The means for body weights and body weights changes were calculated and rounded separately.

Appendix I - Table 2
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Control
Females

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
401	219	4	223	-2	221	-4	217	-2
402	236	-9	227	11	238	-8	230	-6
403	227	3	230	1	231	9	240	13
404	240	0	240	6	246	-12	234	-6
405	238	4	242	10	252	14	266	28
Mean	232	0	232	5	238	0	237	5
SD	9	6	8	6	12	11	18	15

The means for body weights and body weights changes were calculated and rounded separately.

Appendix I - Table 3
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

10 ppm
Males

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
406	206	9	215	5	220	-1	219	13
407	221	-3	218	-1	217	0	217	-4
408	211	1	212	-1	211	-8	203	-8
409	218	6	224	3	227	-3	224	6
410	207	-1	206	-2	204	0	204	-3
Mean	213	2	215	1	216	-2	213	1
SD	7	5	7	3	9	3	9	9

The means for body weights and body weights changes were calculated and rounded separately.

Appendix I - Table 4
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

10 ppm
Females

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
406	236	12	248	6	254	-4	250	14
407	245	3	248	5	253	12	265	20
408	243	-1	242	-12	230	19	249	6
409	228	-4	224	-2	222	-4	218	-10
410	235	5	240	6	246	-3	243	8
Mean	237	3	240	1	241	4	245	8
SD	7	6	10	8	14	11	17	11

The means for body weights and body weights changes were calculated and rounded separately.

Appendix I - Table 5
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

100 ppm
Males

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
411	200	-4	196	7	203	1	204	4
412	213	-3	210	-6	204	-1	203	-10
413	231	4	235	-3	232	-1	231	0
414	207	2	209	6	215	-5	210	3
415	216	0	216	2	218	-1	217	1
Mean	213	0	213	1	214	-1	213	0
SD	12	3	14	6	12	2	12	6

The means for body weights and body weights changes were calculated and rounded separately.

Appendix I - Table 6
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

100 ppm
Females

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
411	237	3	240	-1	239	19	258	21
412	220	5	225	1	226	0	226	6
413	251	0	251	-10	241	16	257	6
414	229	-6	223	9	232	6	238	9
415	225	-3	222	8	230	-16	214	-11
Mean	232	0	232	1	234	5	239	6
SD	12	4	13	8	6	14	19	11

The means for body weights and body weights changes were calculated and rounded separately.

Appendix I - Table 7
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

1000 ppm
Males

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
416	211	5	216	1	217	-5	212	1
417	225	-3	222	0	222	-10	212	-13
418	210	8	218	4	222	1	223	13
419	204	4	208	-4	204	-4	200	-4
420	215	5	220	9	229	-4	225	10
Mean	213	4	217	2	219	-4	214	1
SD	8	4	5	5	9	4	10	11

The means for body weights and body weights changes were calculated and rounded separately.

Appendix I - Table 8
Adult Body Weight (g)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

1000 ppm
Females

Pen	Week 0	Change Week 0-2	Week 2	Change Week 2-4	Week 4	Change Week 4-6	Week 6	Total Change
416	238	-2	236	6	242	2	244	6
417	245	4	249	1	250	9	259	14
418	220	-1	219	-4	215	-1	214	-6
419	234	-5	229	6	235	0	235	1
420	241	-16	225	12	237	4	241	0
Mean	236	-4	232	4	236	3	239	3
SD	10	7	12	6	13	4	16	7

The means for body weights and body weights changes were calculated and rounded separately.

Appendix II - Table 1
Feed Consumption (g/bird/day)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Control

	Weeks					
Pen	1	2	3	4	5	6
401	18	19	20	22	21	22
402	19	21	22	24	24	24
403	20	20	22	22	22	22
404	18	22	23	23	20	20
405	20	20	27	27	25	26
Mean	19	20	23	24	23	23
SD	1	1	2	2	2	2

Appendix II - Table 2
Feed Consumption (g/bird/day)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

10 ppm

	Weeks					
Pen	1	2	3	4	5	6
406	21	25	25	25	22	24
407	20	23	24	26	24	26
408	21	22	23	24	21	24
409	19	20	23	24	19	22
410	19	20	24	24	23	24
Mean	20	22	24	24	22	24
SD	1	2	1	1	2	1

Appendix II - Table 3
Feed Consumption (g/bird/day)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

100 ppm

	Weeks					
Pen	1	2	3	4	5	6
411	17	19	24	23	24	24
412	18	19	21	21	20	23
413	21	25	32	31	27	28
414	19	21	24	23	24	23
415	18	19	22	22	21	21
Mean	19	21	25	24	23	24
SD	2	3	4	4	3	3

Appendix II - Table 4
Feed Consumption (g/bird/day)
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

1000 ppm

	Weeks					
Pen	1	2	3	4	5	6
416	18	20	24	23	23	24
417	20	25	36	28	27	24
418	17	20	26	23	23	24
419	18	20	22	22	21	21
420	18	21	28	25	24	24
Mean	18	21	27	24	24	24
SD	1	2	5	2	2	1

Appendix III - Table 1
Eggs Laid per Pen per Week
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Control

Pen	Weeks						Totals	Eggs/Hen/Day
	1	2	3	4	5	6		
			Lot A	Lot B	Lot C	Lot D		
401	5	4	5	7	6	6	33	0.79
402	5	6	5	6	7	7	36	0.86
403	4	5	5	6	7	6	33	0.79
404	5	4	5	7	6	7	34	0.81
405	5	4	6	7	7	6	35	0.83
Totals	24	23	26	33	33	32	171	0.81

Appendix III - Table 2
Eggs Laid per Pen per Week
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

10 ppm

Pen	Weeks						Totals	Eggs/Hen/Day
	1	2	3	4	5	6		
			Lot A	Lot B	Lot C	Lot D		
406	5	7	7	7	7	7	40	0.95
407	5	4	7	7	7	6	36	0.86
408	6	6	7	7	6	7	39	0.93
409	4	3	4	5	4	4	24	0.57
410	3	5	5	6	7	7	33	0.79
Totals	23	25	30	32	31	31	172	0.82

Appendix III - Table 3
Eggs Laid per Pen per Week
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

100 ppm

Pen	Weeks						Totals	Eggs/Hen/Day
	1	2	3	4	5	6		
			Lot A	Lot B	Lot C	Lot D		
411	4	4	7	7	7	7	36	0.86
412	6	7	7	6	7	7	40	0.95
413	4	6	6	7	7	6	36	0.86
414	5	6	6	7	7	7	38	0.90
415	4	5	5	7	6	7	34	0.81
Totals	23	28	31	34	34	34	184	0.88

Appendix III - Table 4
Eggs Laid per Pen per Week
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

1000 ppm

Pen	Weeks						Totals	Eggs/Hen/Day
	1	2	3	4	5	6		
			Lot A	Lot B	Lot C	Lot D		
416	2	4	3	6	6	7	28	0.67
417	6	7	7	7	6	7	40	0.95
418	4	4	5	5	5	5	28	0.67
419	4	5	5	6	7	7	34	0.81
420	6	7	6	7	7	7	40	0.95
Totals	22	27	26	31	31	33	170	0.81

Appendix IV - Table 1
Reproductive Performance by Lot and Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Control - 0 ppm

Pen Number	Lot	Eggs Laid	Eggs Cracked	Abnormal or Damaged	Eggs Set	Viable Embryos	Live 3-Week Embryos	Hatchlings	14-Day Old Survivors
401	A	5	0	0	4	4	4	4	3
	B	7	0	0	7	7	7	7	7
	C	6	0	0	5	5	5	3	3
	D	6	0	0	6	6	6	6	6
	Total	24	0	0	22	22	22	20	19
402	A	5	0	0	5	5	5	3	2
	B	6	0	0	5	5	5	4	1
	C	7	0	0	7	7	7	7	6
	D	7	0	0	6	6	6	6	5
	Total	25	0	0	23	23	23	20	14
403	A	5	0	0	4	4	4	3	3
	B	6	0	0	6	6	6	6	5
	C	7	0	0	6	6	6	6	6
	D	6	0	0	6	6	6	5	5
	Total	24	0	0	22	22	22	20	19
404	A	5	0	0	5	5	5	5	4
	B	7	0	0	6	6	6	6	6
	C	6	1	0	5	5	5	5	4
	D	7	2	0	4	4	4	4	4
	Total	25	3	0	20	20	20	20	18
405	A	6	0	0	5	5	5	4	4
	B	7	0	0	7	7	7	6	6
	C	7	0	0	6	6	6	6	5
	D	6	0	0	6	6	6	6	5
	Total	26	0	0	24	24	24	22	20
Group Total		124	3	0	111	111	111	102	90

[1] Based on 28 days of egg production (Days 15-42), corresponding to Weeks 3 thru 6.

Appendix IV - Table 2
Reproductive Performance by Lot and Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

10 ppm

Pen Number	Lot	Eggs Laid	Eggs Cracked	Abnormal or Damaged	Eggs Set	Viable Embryos	Live 3-Week Embryos	Hatchlings	14-Day Old Survivors
406	A	7	0	0	7	7	7	6	5
	B	7	0	0	6	6	6	6	5
	C	7	0	0	7	7	7	7	7
	D	7	0	0	6	6	6	6	6
	Total	28	0	0	26	26	26	25	23
407	A	7	0	0	6	5	5	5	5
	B	7	0	0	7	7	7	7	7
	C	7	0	0	6	6	6	6	5
	D	6	0	0	6	6	5	5	5
	Total	27	0	0	25	24	23	23	22
408	A	7	0	0	7	7	7	7	7
	B	7	0	0	6	6	6	6	2
	C	6	0	0	6	6	6	4	3
	D	7	0	0	6	6	6	6	6
	Total	27	0	0	25	25	25	23	18
409	A	4	0	0	3	3	3	3	3
	B	5	0	0	5	4	4	4	4
	C	4	0	0	3	3	3	3	3
	D	4	0	0	4	3	3	3	3
	Total	17	0	0	15	13	13	13	13
410	A	5	0	0	5	5	5	5	5
	B	6	0	0	5	5	5	4	4
	C	7	0	0	7	7	7	7	5
	D	7	0	0	6	6	6	6	6
	Total	25	0	0	23	23	23	22	20
Group Total		124	0	0	114	111	110	106	96

[1] Based on 28 days of egg production (Days 15-42), corresponding to Weeks 3 thru 6.

Appendix IV - Table 3
Reproductive Performance by Lot and Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

100 ppm

Pen Number	Lot	Eggs Laid	Eggs Cracked	Abnormal or Damaged	Eggs Set	Viable Embryos	Live 3-Week Embryos	Hatchlings	14-Day Old Survivors
411	A	7	0	1	5	5	5	4	4
	B	7	0	0	7	7	7	7	7
	C	7	0	0	6	6	6	6	5
	D	7	0	0	7	7	7	6	6
	Total	28	0	1	25	25	25	23	22
412	A	7	0	0	7	7	7	7	5
	B	6	0	0	5	5	5	5	5
	C	7	0	0	7	7	7	7	7
	D	7	0	0	6	6	6	6	5
	Total	27	0	0	25	25	25	25	22
413	A	6	0	0	5	5	5	4	4
	B	7	0	1	6	6	6	6	5
	C	7	0	0	6	6	6	6	6
	D	6	0	0	6	6	6	6	6
	Total	26	0	1	23	23	23	22	21
414	A	6	0	0	6	6	6	6	5
	B	7	0	0	6	6	6	6	6
	C	7	0	0	7	7	7	6	6
	D	7	0	0	6	5	5	4	4
	Total	27	0	0	25	24	24	22	21
415	A	5	0	0	4	4	4	4	4
	B	7	0	0	7	7	7	6	6
	C	6	0	0	5	5	5	5	5
	D	7	0	0	7	7	7	7	5
	Total	25	0	0	23	23	23	22	20
Group Total		133	0	2	121	120	120	114	106

[1] Based on 28 days of egg production (Days 15-42), corresponding to Weeks 3 thru 6.

Appendix IV - Table 4
Reproductive Performance by Lot and Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

1000 ppm

Pen Number	Lot	Eggs Laid	Eggs Cracked	Abnormal or Damaged	Eggs Set	Viable Embryos	Live 3-Week Embryos	Hatchlings	14-Day Old Survivors
416	A	3	0	0	3	3	3	3	2
	B	6	0	0	5	4	4	4	4
	C	6	0	0	6	6	6	6	6
	D	7	0	0	6	6	6	6	6
	Total	22	0	0	20	19	19	19	18
417	A	7	0	0	6	4	4	4	3
	B	7	1	0	6	5	5	5	3
	C	6	0	0	5	5	5	5	5
	D	7	0	0	7	3	3	3	3
	Total	27	1	0	24	17	17	17	14
418	A	5	0	0	5	5	5	3	2
	B	5	1	0	3	3	3	3	2
	C	5	0	0	5	5	5	4	3
	D	5	0	0	4	4	4	4	4
	Total	20	1	0	17	17	17	14	11
419	A	5	0	0	4	4	4	3	2
	B	6	0	0	6	6	6	6	6
	C	7	0	0	6	6	6	6	6
	D	7	0	0	7	7	7	7	7
	Total	25	0	0	23	23	23	22	21
420	A	6	0	0	6	5	5	5	5
	B	7	0	0	5	4	4	4	4
	C	7	0	0	7	7	7	7	7
	D	7	0	0	6	4	4	2	2
	Total	27	0	0	24	20	20	18	18
Group Total		121	2	0	108	96	96	90	82

[1] Based on 28 days of egg production (Days 15-42), corresponding to Weeks 3 thru 6.

Appendix V - Table 1
Reproductive Performance by Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Eggs Laid / Maximum Laid (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	Eggs Laid	Max. Laid	%	Eggs Laid	Max. Laid	%	Eggs Laid	Max. Laid	%	Eggs Laid	Max. Laid	%
1	24	28	86	28	28	100	28	28	100	22	28	79
2	25	28	89	27	28	96	27	28	96	27	28	96
3	24	28	86	27	28	96	26	28	93	20	28	71
4	25	28	89	17	28	61	27	28	96	25	28	89
5	26	28	93	25	28	89	25	28	89	27	28	96
Total	124	140		124	140		133	140		121	140	
Mean	24.8	28.0	89	24.8	28.0	89	26.6	28.0	95	24.8	28.0	86
SD	0.8	0.0	3.0	4.5	0.0	16.1	1.1	0.0	4.1	3.1	0.0	11.1

Eggs Cracked or Damaged/ Eggs Laid (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	Eggs Crack.	Eggs Laid	%	Eggs Crack.	Eggs Laid	%	Eggs Crack.	Eggs Laid	%	Eggs Crack.	Eggs Laid	%
1	0	24	0	0	28	0	0	28	0	0	22	0
2	0	25	0	0	27	0	0	27	0	1	27	4
3	0	24	0	0	27	0	0	26	0	1	20	5
4	3	25	12	0	17	0	0	27	0	0	25	0
5	0	26	0	0	25	0	0	25	0	0	27	0
Total	3	124		0	124		0	133		2	121	
Mean	1	24.8	2	0	24.8	0	0	26.6	0	0	24.2	2
SD	1.3	0.8	5.4	0.0	4.5	0.0	0.0	1.1	0.0	0.5	3.1	2.4

[1] Based on 28 days of egg production (Days 15-42).

Appendix V - Table 2
Reproductive Performance by Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Viable Embryos / Eggs Set (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	Viable Embryo	Eggs Set	%	Viable Embryo	Eggs Set	%	Viable Embryo	Eggs Set	%	Viable Embryo	Eggs Set	%
1	22	22	100	26	26	100	25	25	100	19	20	95
2	23	23	100	24	25	96	25	25	100	17	24	71
3	22	22	100	25	25	100	23	23	100	17	17	100
4	20	20	100	13	15	87	24	25	96	23	23	100
5	24	24	100	23	23	100	23	23	100	20	24	83
Total	111	111		111	114		120	121		96	108	
Mean	22.2	22.2	100	22.2	22.8	97	24.0	24.2	99	19.2	21.6	90
SD	1.5	1.5	0.0	5.3	4.5	5.8	1.0	1.1	1.8	2.5	3.0	12.6

Live 3-Week Embryos / Viable Embryos (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	Live 3-Week	Viable Embryo	%	Live 3-Week	Viable Embryo	%	Live 3-Week	Viable Embryo	%	Live 3-Week	Viable Embryo	%
1	22	22	100	26	26	100	25	25	100	19	19	100
2	23	23	100	23	24	96	25	25	100	17	17	100
3	22	22	100	25	25	100	23	23	100	17	17	100
4	20	20	100	13	13	100	24	24	100	23	23	100
5	24	24	100	23	23	100	23	23	100	20	20	100
Total	111	111		110	111		120	120		96	96	
Mean	22	22.2	100	22	22.2	99	24	24.0	100	19	19.2	100
SD	1.5	1.5	0.0	5.2	5.3	1.9	1.0	1.0	0.0	2.5	2.5	0.0

[1] Based on 28 days of egg production (Days 15-42).

Appendix V - Table 3
Reproductive Performance by Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Hatchlings / Live 3-Week Embryos (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	Number Hatch	Live 3-Week	%	Number Hatch	Live 3-Week	%	Number Hatch	Live 3-Week	%	Number Hatch	Live 3-Week	%
1	20	22	91	25	26	96	23	25	92	19	19	100
2	20	23	87	23	23	100	25	25	100	17	17	100
3	20	22	91	23	25	92	22	23	96	14	17	82
4	20	20	100	13	13	100	22	24	92	22	23	96
5	22	24	92	22	23	96	22	23	96	18	20	90
Total	102	111		106	110		114	120		90	96	
Mean	20.4	22.2	92	21.2	22.0	97	22.8	24.0	95	18.0	19.2	94
SD	0.9	1.5	4.8	4.7	5.2	3.4	1.3	1.0	3.4	2.9	2.5	7.5

14-Day Old Survivors / Hatchlings (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	14-Day Old	Number Hatch	%	14-Day Old	Number Hatch	%	14-Day Old	Number Hatch	%	14-Day Old	Number Hatch	%
1	19	20	95	23	25	92	22	23	96	18	19	95
2	14	20	70	22	23	96	22	25	88	14	17	82
3	19	20	95	18	23	78	21	22	95	11	14	79
4	18	20	90	13	13	100	21	22	95	21	22	95
5	20	22	91	20	22	91	20	22	91	18	18	100
Total	90	102		96	106		106	114		82	90	
Mean	18	20.4	88	19	21.2	91	21	22.8	93	16	18.0	90
SD	2.3	0.9	10.4	4.0	4.7	8.1	0.8	1.3	3.5	3.9	2.9	9.2

[1] Based on 28 days of egg production (Days 15-42).

Appendix V - Table 4
Reproductive Performance by Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Hatchlings / Eggs Set (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	Number Hatch	Eggs Set	%	Number Hatch	Eggs Set	%	Number Hatch	Eggs Set	%	Number Hatch	Eggs Set	%
1	20	22	91	25	26	96	23	25	92	19	20	95
2	20	23	87	23	25	92	25	25		17	24	71
3	20	22	91	23	25	92	22	23	96	14	17	82
4	20	20	100	13	15	87	22	25	88	22	23	96
5	22	24	92	22	23	96	22	23	96	18	24	75
Total	102	111		106	114		114	121		90	108	
Mean	20.4	22.2	92	21.2	22.8	92	22.8	24.2	93	18.0	21.6	84
SD	0.9	1.5	4.8	4.7	4.5	3.8	1.3	1.1	3.6	2.9	3.0	11.3

14-Day Old Survivors / Eggs Set (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	14-Day Old	Eggs Set	%	14-Day Old	Eggs Set	%	14-Day Old	Eggs Set	%	14-Day Old	Eggs Set	%
1	19	22	86	23	26	88	22	25	88	18	20	90
2	14	23	61	22	25	88	22	25		14	24	58
3	19	22	86	18	25	72	21	23	91	11	17	65
4	18	20	90	13	15	87	21	25	84	21	23	91
5	20	24	83	20	23	87	20	23	87	18	24	75
Total	90	111		96	114		106	121		82	108	
Mean	18	22.2	81	19	22.8	84	21	24.2	88	16	21.6	76
SD	2.3	1.5	11.7	4.0	4.5	7.0	0.8	1.1	3.0	3.9	3.0	14.8

[1] Based on 28 days of egg production (Days 15-42).

Appendix V - Table 5
Reproductive Performance by Pen[1]
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Hatchlings / Maximum Set (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	Number Hatch	Max. Set	%	Number Hatch	Max. Set	%	Number Hatch	Max. Set	%	Number Hatch	Max. Set	%
1	20	25	80	25	25	100	23	25	92	19	25	76
2	20	25	80	23	25	92	25	25	100	17	25	68
3	20	25	80	23	25	92	22	25	88	14	25	56
4	20	25	80	13	25	52	22	25	88	22	25	88
5	22	25	88	22	25	88	22	25	88	18	25	72
Total	102	125		106	125		114	125		90	125	
Mean	20.4	25.0	82	21.2	25.0	85	22.8	25.0	91	18.0	25.0	72
SD	0.9	0.0	3.6	4.7	0.0	18.8	1.3	0.0	5.2	2.9	0.0	11.7

14-Day Old Survivors / Maximum Set (%)

	0 ppm			10 ppm			100 ppm			1000 ppm		
Replicate	14-Day Old	Max. Set	%	14-Day Old	Max. Set	%	14-Day Old	Max. Set	%	14-Day Old	Max. Set	%
1	19	25	76	23	25	92	22	25	88	18	25	72
2	14	25	56	22	25	88	22	25	88	14	25	56
3	19	25	76	18	25	72	21	25	84	11	25	44
4	18	25	72	13	25	52	21	25	84	21	25	84
5	20	25	80	20	25	80	20	25	80	18	25	72
Total	90	125		96	125		106	125		82	125	
Mean	18	25.0	72	19	25.0	77	21	25.0	85	16	25.0	66
SD	2.3	0.0	9.4	4.0	0.0	15.8	0.8	0.0	3.3	3.9	0.0	15.6

[1] Based on 28 days of egg production (Days 15-42).

Appendix VI - Table 1
Egg Shell Thickness Measurements (mm) per Pen
from a Northern Bobwhite Pilot Quail Reproduction Study with H-28548

	Pen Number	Lot A	Lot B	Lot C	Lot D	Mean	SD
Control	401	0.209		0.208		0.208	0.001
0	402		0.230		0.235	0.233	0.004
ppm	403	0.210		0.217		0.213	0.005
	404		0.209		0.212	0.210	0.002
	405	0.228		0.238		0.233	0.008
					Group Mean +/- SD	0.220	0.012
10	406		0.211		0.212	0.211	0.001
ppm	407	0.240		0.252		0.246	0.008
	408		0.224		0.223	0.224	0.001
	409	0.256		0.249		0.252	0.005
	410		0.228		0.231	0.229	0.002
					Group Mean +/- SD	0.233	0.017
100	411	0.246		0.268		0.257	0.015
ppm	412		0.221		0.213	0.217	0.006
	413	0.232		0.231		0.231	0.000
	414		0.229		0.235	0.232	0.004
	415	0.239		0.245		0.242	0.004
					Group Mean +/- SD	0.236	0.015
1000	416		0.228		0.229	0.229	0.000
ppm	417	0.220		0.231		0.226	0.008
	418		0.223		0.212	0.217	0.008
	419	0.228		0.222		0.225	0.005
	420		0.202		0.211	0.207	0.006
					Group Mean +/- SD	0.221	0.009

Appendix VII - Table 1
Mean Hatchling Body Weight (g) per Pen by Lot
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Control - 0 ppm a.i.

Pen Number	Lot A Mean Weight (g)	Lot A Number of Hatchlings	Lot B Mean Weight (g)	Lot B Number of Hatchlings	Lot C Mean Weight (g)	Lot C Number of Hatchlings	Lot D Mean Weight (g)	Lot D Number of Hatchlings	Mean	SD	Total Hatch
401	5.6	4	5.4	7	5.7	3	6.1	6	5.7	0.4	20
402	5.8	3	5.3	4	5.9	7	6.1	6	5.8	0.6	20
403	4.9	3	5.0	6	5.1	6	5.5	5	5.1	0.3	20
404	5.8	5	6.6	6	6.0	5	6.6	4	6.2	0.6	20
405	5.4	4	5.5	6	5.7	6	6.4	6	5.8	0.6	22
									Mean	SD	
									5.7	0.4	102

10 ppm a.i.

Pen Number	Lot A Mean Weight (g)	Lot A Number of Hatchlings	Lot B Mean Weight (g)	Lot B Number of Hatchlings	Lot C Mean Weight (g)	Lot C Number of Hatchlings	Lot D Mean Weight (g)	Lot D Number of Hatchlings	Mean	SD	Total Hatch
406	5.7	6	5.9	6	6.1	7	6.0	6	5.9	0.4	25
407	4.9	5	5.7	7	5.4	6	5.6	5	5.4	0.4	23
408	5.6	7	5.7	6	6.2	4	6.2	6	5.9	0.4	23
409	5.3	3	5.4	4	5.4	3	5.2	3	5.3	0.3	13
410	5.3	5	5.5	4	5.5	7	5.5	6	5.5	0.3	22
									Mean	SD	
									5.6	0.3	106

Appendix VII - Table 2
Mean Hatchling Body Weight (g) per Pen by Lot
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

100 ppm a.i.

Pen Number	Lot A Mean Weight (g)	Lot A Number of Hatchlings	Lot B Mean Weight (g)	Lot B Number of Hatchlings	Lot C Mean Weight (g)	Lot C Number of Hatchlings	Lot D Mean Weight (g)	Lot D Number of Hatchlings	Mean	SD	Total Hatch
411	5.6	4	6.0	7	6.4	6	6.6	6	6.2	0.6	23
412	5.9	7	6.2	5	5.8	7	6.2	6	6.0	0.3	25
413	5.4	4	5.9	6	5.9	6	6.4	6	5.9	0.4	22
414	5.1	6	5.9	6	5.5	6	6.4	4	5.6	0.5	22
415	6.0	4	5.9	6	6.0	5	5.8	7	5.9	0.4	22
									Mean	SD	
									5.9	0.2	114

1000 ppm a.i.

Pen Number	Lot A Mean Weight (g)	Lot A Number of Hatchlings	Lot B Mean Weight (g)	Lot B Number of Hatchlings	Lot C Mean Weight (g)	Lot C Number of Hatchlings	Lot D Mean Weight (g)	Lot D Number of Hatchlings	Mean	SD	Total Hatch
416	5.8	3	6.1	4	6.2	6	6.4	6	6.2	0.3	19
417	5.5	4	5.6	5	5.7	5	5.9	3	5.7	0.3	17
418	5.1	3	5.4	3	5.8	4	6.1	4	5.6	0.5	14
419	5.2	3	5.7	6	5.7	6	6.0	7	5.7	0.4	22
420	5.7	5	5.6	4	5.8	7	6.3	2	5.8	0.3	18
									Mean	SD	
									5.8	0.2	90

Appendix VIII - Table 1
14-Day Old Survivor Hatchling Body Weight (g) per Pen by Lot
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

Control - 0 ppm a.i.

Pen Number	Lot A Mean Weight (g)	Lot A Number of 14-Day Olds	Lot B Mean Weight (g)	Lot B Number of 14-Day Olds	Lot C Mean Weight (g)	Lot C Number of 14-Day Olds	Lot D Mean Weight (g)	Lot D Number of 14-Day Olds	Mean	SD	Total 14-Day
401	20	3	23	7	21	3	24	6	23	3.8	19
402	24	2	27	1	28	6	25	4	26	4.7	13
403	22	3	25	5	25	6	28	5	25	2.6	19
404	25	4	26	6	30	4	31	4	28	4.6	18
405	19	4	25	6	23	5	30	5	25	4.9	20
									Mean	SD	
									25	1.9	89

10 ppm

Pen Number	Lot A Mean Weight (g)	Lot A Number of 14-Day Olds	Lot B Mean Weight (g)	Lot B Number of 14-Day Olds	Lot C Mean Weight (g)	Lot C Number of 14-Day Olds	Lot D Mean Weight (g)	Lot D Number of 14-Day Olds	Mean	SD	Total 14-Day
406	24	5	22	5	27	7	27	6	25	5.3	23
407	22	5	27	7	29	5	30	5	27	4.3	22
408	23	7	27	2	24	3	29	6	25	4.0	18
409	23	3	25	4	23	3	25	3	24	2.4	13
410	23	5	26	4	24	5	23	6	24	2.9	20
									Mean	SD	
									25	1.3	96

Appendix VIII - Table 2
14-Day Old Survivor Hatchling Body Weight (g) per Pen by Lot
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548

100 ppm

Pen Number	Lot A Mean Weight (g)	Lot A Number of 14-Day Olds	Lot B Mean Weight (g)	Lot B Number of 14-Day Olds	Lot C Mean Weight (g)	Lot C Number of 14-Day Olds	Lot D Mean Weight (g)	Lot D Number of 14-Day Olds	Mean	SD	Total 14-Day
411	24	4	23	7	23	5	29	6	25	3.1	22
412	26	5	24	5	29	7	27	5	27	4.3	22
413	28	4	32	5	32	6	31	6	31	2.8	21
414	26	5	26	6	29	6	27	4	27	3.4	21
415	27	4	30	6	28	5	28	5	28	4.0	20
									Mean	SD	
									28	2.3	106

1000 ppm

Pen Number	Lot A Mean Weight (g)	Lot A Number of 14-Day Olds	Lot B Mean Weight (g)	Lot B Number of 14-Day Olds	Lot C Mean Weight (g)	Lot C Number of 14-Day Olds	Lot D Mean Weight (g)	Lot D Number of 14-Day Olds	Mean	SD	Total 14-Day
416	27	2	30	4	32	6	27	6	29	5.0	18
417	22	3	29	3	34	5	21	3	27	6.7	14
418	22	2	23	2	24	3	20	4	22	4.5	11
419	25	2	30	6	30	6	30	7	29	3.2	21
420	23	5	26	4	33	7	31	2	28	6.0	18
									Mean	SD	
									27	3.1	82

Appendix IX - Table 1
Individual Gross Pathological Observations
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548
Birds Euthanized at Test Termination

Control

Males

Finding	Pen Number				
	401	402	403	404	405
Liver - pale	-	-	-	-	X
Liver - mottled	-	-	-	-	X
Not remarkable	X	X	X	X	-

Females

Finding	Pen Number				
	401	402	403	404	405
External - feather loss	-	X	-	-	X
Not remarkable	X	-	X	X	-

Appendix IX - Table 2
Individual Gross Pathological Observations
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548
Birds Euthanized at Test Termination

10 ppm

Males

Finding	Pen Number				
	406	407	408	409	410
External - feather loss	-	-	-	X	-
External - tips of toes missing	-	-	X	-	-
External - toe lesions	-	-	X	-	-
Reproductive - right testis small, ~ 1.25 cm	X	X	X	-	-
Not remarkable	-	-	-	-	X

Females

Finding	Pen Number				
	406	407	408	409	410
External - feather loss	-	-	-	X	-
Not remarkable	X	X	X	-	X

Appendix IX - Table 3
Individual Gross Pathological Observations
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548
Birds Euthanized at Test Termination

100 ppm

Males

Finding	Pen Number				
	411	412	413	414	415
Reproductive - right testis small, ~ 1.5 cm	-	-	X	-	-
Reproductive - right testis small, ~ 1.25 cm	X	-	-	-	-
Not remarkable	-	X	-	X	X

Females

Finding	Pen Number				
	411	412	413	414	415
External - feather loss	X	-	-	-	-
Liver - mottled	-	X	-	-	-
Not remarkable	-	-	X	X	X

Appendix IX - Table 4
Individual Gross Pathological Observations
from a Northern Bobwhite Quail Pilot Reproduction Study with H-28548
Birds Euthanized at Test Termination

1000 ppm

Males

Finding	Pen Number				
	416	417	418	419	420
External - feather loss	-	X	-	-	-
External - lesion on lower back	-	X	-	-	-
Reproductive - right testis small, ~ 1.5 cm	-	-	-	-	X
Not remarkable	X	-	X	X	-

Females

Finding	Pen Number				
	416	417	418	419	420
External - feather loss	X	X	-	-	-
Liver - small (~ 1 mm), offwhite cysts on lower left lobe	-	-	-	-	X
Not remarkable	-	-	X	X	-

Appendix X

Table 1

Matrix Blanks and Fortifications Analyzed Concurrently with the Samples

Sample			Concentration of H-28548 (ppm)			
Number (112-651-P)	Type	Interval	Fortified	Measured[1]	Percent Recovery	Mean Percent Recovery
MAB-2	Matrix Blank	Week 1 Day 0	0	< LOD	-	
MAS-4	Matrix Fortification	Week 1 Day 0	5.00	5.14	103	96
MAS-5	Matrix Fortification	Week 1 Day 0	100	92.3	92	
MAS-6	Matrix Fortification	Week 1 Day 0	1200	1120	93	
MAB-3	Matrix Blank	Week 1 Day 7	0	< LOD	-	
MAS-7	Matrix Fortification	Week 1 Day 7	5.00	4.93	99	105
MAS-8	Matrix Fortification	Week 1 Day 7	100	107	107	
MAS-9	Matrix Fortification	Week 1 Day 7	1200	1310	109	
MAB-4	Matrix Blank	Week 6 Day 0	0	< LOD	-	
MAS-10	Matrix Fortification	Week 6 Day 0	5.00	3.79	76	91
MAS-11	Matrix Fortification	Week 6 Day 0	100	94.1	94	
MAS-12	Matrix Fortification	Week 6 Day 0	1200	1250	104	

[1]The limit of detection (LOD) was set at the lowest standard analyzed during the sample analyzes 0.0100 µg/mL

Appendix X

Table 2

Homogeneity Week 1 Day 0 in Avian Diet

Nominal Concentration (ppm)	Sample I.D. Number (112-651-P-)	Location Sampled In Mixing Vessel	Week 1 Day 0Concentration Measured[1] (ppm)	Mean Measured Standard Deviation (SD) Coefficient of Variation (CV)	Mean Percent of Nominal
10.0	2	Top Left	8.25		
	3	Top Right	10.9		
	4	Middle Left	8.99	AVG =9.33	93
	5	Middle Right	8.29[2]	SD =1.07	
	6	Bottom Left	10.3	CV =11.5	
	7	Bottom Right	9.26		
1000	10	Top Left	991		
	11	Top Right	1070		
	12	Middle Left	937	AVG = 1020	102
	13	Middle Right	942	SD = 95.6	
	14	Bottom Left	997	CV = 9.38%	
	15	Bottom Right	1190		

[1]Measured values were not corrected for mean procedural recoveries based on sample sets (see Table 3).
[2]The mean of two extractions reported (8.54, 8.03).

Appendix X

Table 3

Verification of H-28548 Concentrations in Avian Diet

Nominal Concentration (ppm)	Sample I.D. Number (112-651-P-)	Interval	H-28548 Concentration Measured[1,2] (ppm)	Mean Measured (ppm)	Percent of Nominal	Mean Percent of Nominal
0	1	1	< LOD	-	-	-
	23	6	< LOD			
10.0	24	6	8.70	8.47	87	85
	25	6	8.23		82	
100	8	1	98.9	94.2	99	94
	9	1	89.4		89	
	26	6	97.4	90.0	97	90
	27	6	82.5		83	
1000	28	6	858	864	86	86
	29	6	870		87	

[1]The limit of detection (LOD) was set at the lowest standard analyzed during the sample analyzes0.010 µg/mL
[2]Measured values were not corrected for mean procedural recoveries based on sample sets (see Table 3).

Appendix X

Table 4

Ambient Stability of H-28548 in Avian Diet During a Pilot Reproduction Study with the Northern Bobwhite

	H-28548 Concentration						
	Day 0[1]			Day 7			
Nominal Concentration (ppm)	Sample Number (112-651-P)	Mean Measured[2,3] (ppm)	Mean Percent of Nominal	Sample Number (112-651-P-)	Measured[2,3] (ppm)	Mean Measured (ppm)	Mean Percent of Day 0
0	1	< LOD		16	< LOD		
10.0	2-7	9.33	93	17 18	9.39 9.70	9.55	102
100	8-9	94.2	94	19 20	99.1 99.7	99.4	106
1000	10-15	1020	102	21 22	982 1070	1030	101

[1]Day 0 values are from homogeneity samples presented in Table 4 and verification samples presented in Table 5.
[2]The limit of detection (LOD) was set at the lowest standard analyzed during the sample analyze s0.0100 µg/mL
[3]Measured values were not corrected for mean procedural recoveries based on sample sets (see Table 3).

Appendix XI
Daily Clinical Observations from a Northern Bobwhite Quail
Pilot Reproduction Study with H-28549

Key to Codes and Abbreviations (Abb.)

Abb.	Definition
AN	Normal in appearance and behavior
cAN	Consider normal
S	Same - Remains as previous observation
BkL	Back lesion
FeL	Feather loss
HB	Head bruising
TL	Toe lesion

Abb.	Definition
dt	digit or tip of digit
ms	missing

Appendix XI - Table 1a

Daily Clinical Observations from a Northern Bobwhite Quail
Pilot Reproduction Study with H-28549

Treatment Group	Pen		Week 1						
			Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Control	401	M	AN	AN	AN	AN	AN	AN	AN
0 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	402	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	403	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	404	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	405	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	406	M	AN	AN	AN	AN	AN	AN	AN
10 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	407	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	408	M	dt ms	S	S	S	S	S	S
		F	AN	AN	AN	AN	AN	AN	AN
	409	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	410	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	411	M	AN	AN	AN	AN	AN	AN	AN
100 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	412	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	413	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	414	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	415	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	416	M	AN	AN	AN	AN	AN	AN	AN
1000 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	417	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	418	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	419	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	420	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN

AN - Appears normal; other observation codes - see Key.

Appendix XI - Table 1b

Daily Clinical Observations from a Northern Bobwhite Quail
Pilot Reproduction Study with H-28549

Treatment Group	Pen		Week 2						
			Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Control	401	M	AN	AN	AN	AN	AN	AN	AN
0 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	402	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	403	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	404	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	405	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	406	M	AN	AN	AN	AN	AN	AN	AN
10 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	407	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	408	M	cAN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	409	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	410	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	411	M	AN	AN	AN	AN	AN	AN	AN
100 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	412	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	413	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	414	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	415	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	416	M	AN	AN	AN	AN	AN	AN	AN
1000 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	417	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	418	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	419	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	420	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN

AN - Appears normal; other observation codes - see Key.

Appendix XI - Table 1c

Daily Clinical Observations from a Northern Bobwhite Quail
Pilot Reproduction Study with H-28549

Treatment Group	Pen		Week 3 Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Control	401	M	AN	AN	AN	AN	AN	AN	AN
0 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	402	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	403	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	404	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	405	M	AN	AN	AN	AN	AN	AN	AN
		F	FeL, HB	S	S	S	S	S	S
	406	M	AN	AN	AN	AN	AN	AN	AN
10 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	407	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	408	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	409	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	410	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	411	M	AN	AN	AN	AN	AN	AN	AN
100 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	412	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	413	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	414	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	415	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	416	M	AN	AN	AN	AN	AN	AN	AN
1000 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	417	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	418	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	419	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	420	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN

AN - Appears normal; other observation codes - see Key.

Appendix XI - Table 1d

Daily Clinical Observations from a Northern Bobwhite Quail
Pilot Reproduction Study with H-28549

Treatment Group	Pen		Week 4 Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Control	401	M	AN	AN	AN	AN	AN	AN	AN
0 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	402	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	403	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	404	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	405	M	AN	AN	AN	AN	AN	AN	AN
		F	FeL	S	S	S	S	S	S
	406	M	AN	AN	AN	AN	AN	AN	AN
10 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	407	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	408	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	409	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	410	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	411	M	AN	AN	AN	AN	AN	AN	AN
100 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	412	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	413	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	414	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	415	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	416	M	AN	AN	AN	AN	AN	AN	AN
1000 ppm a.i.		F	FeL	S	S	S	S	S	S
	417	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	418	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	419	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	420	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN

AN - Appears normal; other observation codes - see Key.

Appendix XI - Table 1e

Daily Clinical Observations from a Northern Bobwhite Quail
Pilot Reproduction Study with H-28549

Treatment Group	Pen		Week 5 Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Control	401	M	AN	AN	AN	AN	AN	AN	AN
0 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	402	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	403	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	404	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	405	M	AN	AN	AN	AN	AN	AN	AN
		F	FeL	S	S	S	S	S	S
	406	M	AN	AN	AN	AN	AN	AN	AN
10 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	407	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	408	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	409	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	410	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	411	M	AN	AN	AN	AN	AN	AN	AN
100 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	412	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	413	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	414	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	415	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	416	M	AN	AN	AN	AN	AN	AN	AN
1000 ppm a.i.		F	FeL	S	S	S	S	S	S
	417	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	418	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	419	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	420	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN

AN - Appears normal; other observation codes - see Key.

Appendix XI - Table 1f

Daily Clinical Observations from a Northern Bobwhite Quail
Pilot Reproduction Study with H-28549

Treatment Group	Pen		Week 6						
			Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Control	401	M	AN	AN	AN	AN	AN	AN	AN
0 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	402	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	403	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	404	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	TL	S	S	S	S	S
	405	M	AN	AN	AN	AN	AN	AN	AN
		F	FeL	S	S	S	S	S	S
	406	M	AN	AN	AN	AN	AN	AN	AN
10 ppm a.i.		F	AN	AN	AN	AN	AN	AN	AN
	407	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	408	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	409	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	410	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	411	M	AN	AN	AN	AN	AN	AN	AN
100 ppm a.i.		F	FeL	S	S	S	S	S	S
	412	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	413	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	414	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	415	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	416	M	AN	AN	AN	AN	AN	AN	AN
1000 ppm a.i.		F	FeL	S	S	S	S	S	S
	417	M	AN	AN	AN	AN	BkL	S	S
		F	AN	AN	AN	AN	AN	AN	AN
	418	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	419	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN
	420	M	AN	AN	AN	AN	AN	AN	AN
		F	AN	AN	AN	AN	AN	AN	AN

AN - Appears normal; other observation codes - see Key.